Claims

1.   A method of transmitting an encoded sequence over a network to a terminal,
comprising

storing a plurality of encoded versions of the same sequence, wherein each version
comprises a plurality of discrete portions of data and each version corresponds to a
respective different degree of compression;

transmitting a current one of said versions;

ascertaining the data rate permitted by the network;

ascertaining the state of a receiving buffer at the terminal;

for at least one candidate version, computing in respect of at least one discrete portion
thereof as yet unsent the maximum value of a timing error that would occur were any
number of portions starting with that portion to be sent at the currently ascertained
permitted rate;

comparing the determined maximum error values with the ascertained buffer state;

selecting one of said versions for transmission, in dependence on the results of said
comparisons; and

transmitting the selected version.

2.   A method of transmitting an encoded sequence over a network to a terminal,
comprising

storing a plurality of encoded versions of the same sequence, wherein each version
comprises a plurality of discrete portions of data and each version corresponds to a
respective different degree of compression;

for each version and for each of a plurality of nominal transmitting rates, computing in
respect of at least one discrete portion thereof the maximum value of a timing error that
would occur were any number of portions starting with that portion to be sent at the
respective nominal rate;

storing said maximum error values;

transmitting a current one of said versions;

ascertaining the data rate permitted by the network;

ascertaining the state of a receiving buffer at the terminal;

5   for at least one candidate version, using the ascertained permitted data rate and the stored maximum error values to estimate a respective maximum error value corresponding to said ascertained permitted data rate;

comparing the estimated maximum error values with the ascertained buffer state;

selecting one of said versions for transmission, in dependence on the results of said
10   comparisons; and

transmitting the selected version.

3.   A method according to claim 1 or 2 in which said maximum timing error
15   determination is performed only for selected ones of said portions at which a version change is to be permitted.

4.   A method according to claim 1, 2 or 3 in which each computed timing error
20   value is the difference between (a) the time needed to transmit, at the relevant rate, the portion in question and zero or more consecutive subsequent portions up to and including any particular portion, and (b) the difference between the playing instant of the respective particular portion and the playing instant of the portion preceding the portion in question.

25

5.   A method according to any one of claims 1 to 4 in which the sequence is a video sequence.

5.   A method according to any one of claims 1 to 4 in which the sequence is an audio sequence.

5   7.   A video recording stored on a carrier, comprising

a plurality of encoded versions of the same video sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression; and

for each discrete portion of each version and for each of a plurality of nominal
10 transmitting rates, a maximum error value for that portion, being the maximum of (a) the value of a timing error that would occur were that portion to be sent at the respective nominal rate; and

(b) the values of a timing error that would occur were that portion and any number of subsequent portions subsequent thereto to be sent at the respective nominal rate.

15

8.   An audio recording stored on a carrier, comprising

a plurality of encoded versions of the same audio sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression; and

20 for each discrete portion of each version and for each of a plurality of nominal transmitting rates, a maximum error value for that portion, being the maximum of (a) the value of a timing error that would occur were that portion to be sent at the respective nominal rate; and

(b) the values of a timing error that would occur were that portion and any number of
25 subsequent portions subsequent thereto to be sent at the respective nominal rate.

9.   An apparatus for transmitting an encoded sequence over a network to a terminal, comprising

a store storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression;

a transmitter; and

5   control means operable to receive data as to the data rate permitted by the network and data as to the state of a receiving buffer at the terminal and, for at least one candidate version, to compute in respect of at least one discrete portion thereof as yet unsent the maximum value of a timing error that would occur were any number of portions starting with that portion to be sent at the permitted rate, to compare the

10   determined maximum error values with the buffer state and to select one of said versions for transmission, in dependence on the results of said comparisons.

10.   An apparatus for transmitting an encoded sequence over a network to a

15   terminal, comprising

a store storing a plurality of encoded versions of the same sequence, wherein each version comprises a plurality of discrete portions of data and each version corresponds to a respective different degree of compression, each version including, for each of a plurality of nominal transmitting rates, in respect of at least one discrete portion thereof,

20   the maximum value of a timing error that would occur were any number of portions starting with that portion to be sent at the respective nominal rate;

a transmitter; and

control means for receiving data as to the data rate permitted by the network and data as to the state of a receiving buffer at the terminal and, for at least one candidate

25   version, to use the permitted data rate and the stored maximum error values to estimate a respective maximum error value corresponding to said permitted data rate, to compare the estimated maximum error values with the buffer state and to select one of said versions for transmission, in dependence on the results of said comparisons.